What is claimed is:

1. A method for producing a fused silica glass containing titania, comprising:

synthesizing particles of silica and titania by delivering a mixture of a silica precursor and a titania precursor to a burner;

growing a porous preform by successively depositing the particles on a deposition surface while rotating and translating the deposition surface relative to the burner; and

consolidating the porous preform into a dense glass.

2. The method of claim 1, wherein a translation speed of the deposition surface is adjusted to maintain a substantially constant distance between the porous preform and the burner during deposition.

3. The method of claim 1, wherein the silica and titania particles are deposited at a temperature below that required to consolidate the porous preform into dense glass.

4. The method of claim 3, wherein consolidating the porous preform into dense glass comprises heating the porous preform to a temperature in a range from 1200 to 1900°C.

5. The method of claim 1, further comprising dehydrating the porous preform by exposing the porous preform to a heated, halide-containing atmosphere prior to consolidation.

6. The method of claim 5, wherein the heated, halide-containing atmosphere comprises chlorine.

7. The method of claim 5, wherein the heated, halide-containing atmosphere comprises fluorine.

8. The method of claim 5, wherein the temperature of the heated, halide-

containing atmosphere is in a range from 900 to 1100°C.

9. The method of claim 1, wherein the glass contains 2 to 12% by weight titania.

10. A method for producing a fused silica glass containing titania and having low OH content, comprising:

synthesizing particles of silica and titania by delivering a mixture of a silica precursor and a titania precursor to a burner;

growing a porous preform by successively depositing the particles on a deposition surface while rotating and translating the deposition surface relative to the burner;

dehydrating the porous preform by exposing the porous preform to a heated, halide-containing atmosphere; and

consolidating the dehydrated porous preform into a dense glass.

11. The method of claim 10, wherein the heated, halide-containing atmosphere comprises chlorine.

12. The method of claim 10, wherein the heated, halide-containing atmosphere comprises fluorine.

13. The method of claim 10, wherein a translation speed of the deposition surface is adjusted to maintain a substantially constant distance between the porous preform and the burner during deposition.

14. The method of claim 10, wherein the silica and titania particles are deposited at a temperature below that required to consolidate the porous preform into dense glass.

15. The method of claim 14, wherein consolidating the porous preform into dense glass comprises heating the porous preform to a temperature in a range from 1200 to 1900°C.

16. A mask blank for extreme ultraviolet lithography made by a process comprising:

synthesizing particles of silica and titania by delivering a mixture of a silica precursor and a titania precursor to a burner;

growing a porous preform by successively depositing the particles on a deposition surface while rotating and translating the deposition surface relative to the burner;

consolidating the porous preform into a dense glass; and

finishing the dense glass into a mask blank.

17. The mask blank of claim 16, comprising the glass contains 2 to 12% by weight titania.

18. A mask blank for extreme ultraviolet lithography made by a process comprising:

synthesizing particles of silica and titania by delivering a mixture of a silica precursor and a titania precursor to a burner;

growing a porous preform by successively depositing the particles on a deposition surface while rotating and translating the deposition surface relative to the burner;

dehydrating the porous preform by exposing the porous preform to a heated, halide-containing atmosphere;

consolidating the porous preform into a dense glass; and

finishing the dense glass into a mask blank.

19. The mask blank of claim 18, wherein the glass contains 2 to 12% titania.